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U.S. Patent

May 3, 1994

Sheet 2 of 12

5,308,250

US-PAT-NO: 5308250

DOCUMENT-IDENTIFIER: US 5308250 A

TITLE: Pressure contact for connecting a coaxial shield to a microstrip ground plane

DATE-ISSUED: May 3, 1994

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP
CODE COUNTRY			
Walz, Dale D.	Colorado Springs	CO	N/A
N/A			

ASSIGNEE INFORMATION:

NAME	CITY	STATE	ZIP
CODE COUNTRY	TYPE CODE		
Hewlett-Packard Company	Palo Alto	CA	N/A
N/A	02		

APPL-NO: 07/ 968908

DATE FILED: October 30, 1992

INT-CL: [05] G01R001/06

US-CL-ISSUED: 439/63; 324/158P

US-CL-CURRENT: 439/63; 324/754

FIELD-OF-SEARCH: 439/63; 439/581 ; 439/482 ; 324/72.5 ; 324/158F ; 324/158P

REF-CITED:

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	Document ID	Kind Codes	Source	Issue Date	Pages	
1	US 5982187 A		USPAT	19991109	10	Res:
2	US 5486767 A		USPAT	19960123	18	Metl
3	US 5414369 A		USPAT	19950509	12	Col:
4	US 5410260 A		USPAT	19950425	15	Col:
5	US 5394099 A		USPAT	19950228	8	Ele:
6	US 5308250 A		USPAT	19940503	16	Pre:
7	US 5225773 A		USPAT	19930706	6	Swi:

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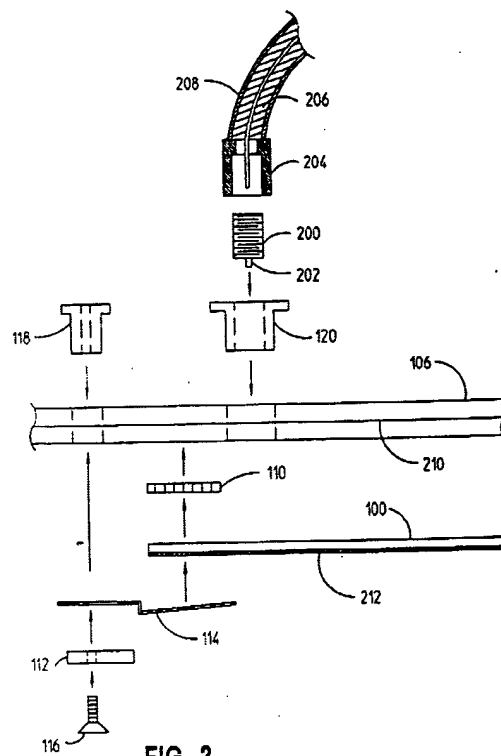


FIG 2

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for
09/453856

US-PAT-NO: 5793218

DOCUMENT-IDENTIFIER: US 5793218 A

TITLE: Generic interface test adapter

DATE-ISSUED: August 11, 1998

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP
CODE COUNTRY			
Oster, Melvin G.	Newbury Park	CA	N/A
N/A			
Fuchs, Brian K.	Chatsworth	CA	N/A
N/A			
Reid, Kenneth	Marina del Rey	CA	N/A
N/A			

ASSIGNEE INFORMATION:

NAME	CITY	STATE	ZIP
CODE COUNTRY TYPE CODE			
Lear Astronics	Santa Monica	CA	N/A
N/A 02			
Corporation			

APPL-NO: 08/ 573026

DATE FILED: December 15, 1995

INT-CL: [06] G01R031/02

US-CL-ISSUED: 324/754; 324/761

US-CL-CURRENT: 324/754; 324/761

FIELD-OF-SEARCH: 324/754; 324/755 ; 324/758 ; 324/761 ; 324/158.1

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	Document ID	Kind Codes	Source	Issue Date	Pages	
1	US 6275054 B1		USPAT	20010814	10	Elect
2	US 6053777 A		USPAT	20000425	9	Coaxi
3	US 5959460 A		USPAT	19990928	9	High
4	US 5883519 A		USPAT	19990316	10	Defie
5	US 5793218 A		USPAT	19980811	14	Gener
6	US D371453 S		USPAT	19960709	3	Winte

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Aug. 11, 1998

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5,793,218

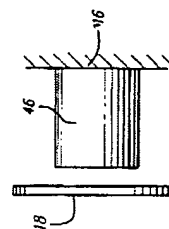


FIG. 5C

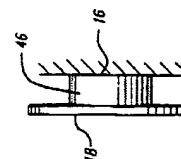


FIG. 5D

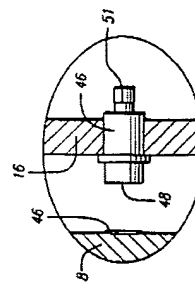


FIG. 5A

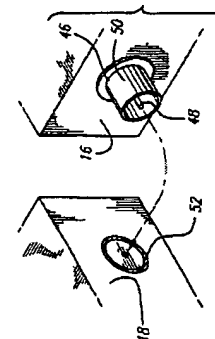


FIG. 5B

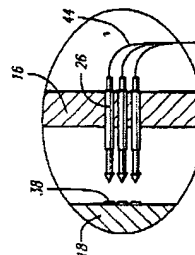


FIG. 4A

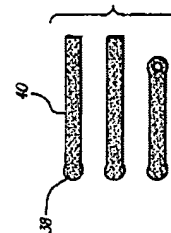


FIG. 4B

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US-PAT-NO: 6053777

DOCUMENT-IDENTIFIER: US 6053777 A

TITLE: Coaxial contact assembly apparatus

DATE-ISSUED: April 25, 2000

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP
CODE	COUNTRY		
Boyle, Stephen A.	Attleboro	MA	N/A
N/A			

ASSIGNEE INFORMATION:

NAME	CITY	STATE	ZIP
CODE	COUNTRY	TYPE CODE	
Rika Electronics	Attleboro	MA	N/A
N/A	02		
International, Inc.			

APPL-NO: 09/ 145914

DATE FILED: September 2, 1998

PARENT-CASE:

RELATED APPLICATIONS Priority is claimed based on Provisional Application No. 60/070,475 filed Jan. 5, 1998.

INT-CL: [07] H01R013/24

U.S. Patent

Apr. 25, 2000

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6,053,777

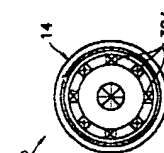


FIGURE 2

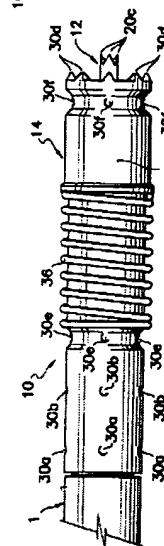


FIGURE 1

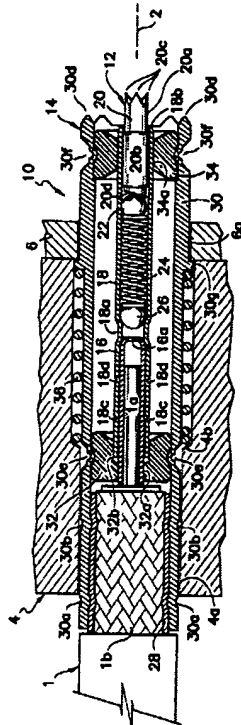


FIGURE 3

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	Document ID	Kind Codes	Source	Issue Date	Pages	
1	US 6275054 B1		USPAT	20010814	10	Ele
2	US 6160409 A		USPAT	20001212	43	Ins
3	US 6053777 A		USPAT	20000425	9	Coa
4	US 6037787 A		USPAT	20000314	10	Higl
5	US 6034532 A		USPAT	20000307	7	Res
6	US 5945835 A		USPAT	19990831	7	Rad

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US-PAT-NO: 5291129

DOCUMENT-IDENTIFIER: US 5291129 A

TITLE: Contact probe

DATE-ISSUED: March 1, 1994

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP
CODE COUNTRY			
Kazama; Toshio	Kanagawa	N/A	N/A
JP			

ASSIGNEE INFORMATION:

NAME	CITY	STATE	ZIP
CODE COUNTRY TYPE CODE			
NHK Spring Co., Ltd.	Yokohama	N/A	N/A
JP 03			

APPL-NO: 07/ 939852

DATE FILED: September 2, 1992

PARENT-CASE:

This is a continuation of application Ser. No. 07/652,088 filed Feb. 7, 1991, now abandoned, which is division of application Ser. No. 07/424,511. filed Oct. 20, 1989 now U.S. Pat. No. 5,004,977.

FOREIGN-APPL-PRIORITY-DATA:

COUNTRY	APPL-NO	APPL-DATE
JP	63-138376	October 24, 1988

U.S. Patent

Mar. 1, 1994

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5,291,129

Fig. 7

PRIOR ART

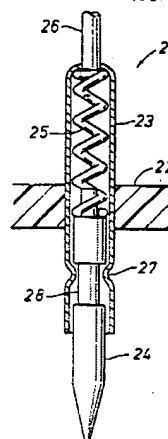
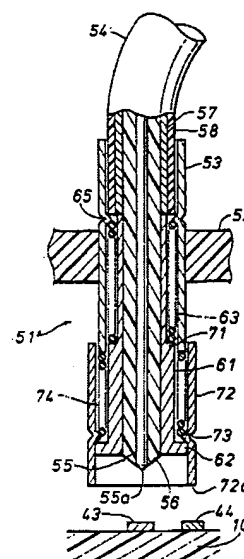


Fig. 15



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	Document ID	Kind Codes	Source	Issue Date	Pages	
5	US 6034532 A		USPAT	20000307	7	Res:
6	US 5945835 A		USPAT	19990831	7	Rad:
7	US 5818246 A		USPAT	19981006	11	Aut:
8	US 5793218 A		USPAT	19980811	14	Gen:
9	US 5459396 A		USPAT	19951017	13	Tes:
10	US 5291129 A		USPAT	19940301	19	Con:
11	US 5196789 A		USPAT	19930323	7	Coat:

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US-PAT-NO: 5291129

DOCUMENT-IDENTIFIER: US 5291129 A

TITLE: Contact probe

DATE-ISSUED: March 1, 1994

INVENTOR-INFORMATION:

NAME	CITY	STATE	ZIP
CODE	COUNTRY		
Kazama; Toshio	Kanagawa	N/A	N/A
JP			

ASSIGNEE INFORMATION:

NAME	CITY	STATE	ZIP
CODE	COUNTRY	TYPE CODE	
NHK Spring Co., Ltd.	Yokohama	N/A	N/A
JP	03		

APPL-NO: 07/ 939852

DATE FILED: September 2, 1992

PARENT-CASE:

This is a continuation of application Ser. No. 07/652,088 filed Feb. 7, 1991, now abandoned, which is division of application Ser. No. 07/424,511, filed Oct. 20, 1989 now U.S. Pat. No. 5,004,977.

FOREIGN-APPL-PRIORITY-DATA:		
COUNTRY	APPL-NO	APPL-DATE
JP	63-138376	October 24, 1988

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	Document ID	Kind Codes	Source	Issue Date	Pages	
5	US 6034532 A		USPAT	20000307	7	Res:
6	US 5945835 A		USPAT	19990831	7	Rad:
7	US 5818246 A		USPAT	19981006	11	Aut:
8	US 5793218 A		USPAT	19980811	14	Gen:
9	US 5459396 A		USPAT	19951017	13	Tes:
10	US 5291129 A		USPAT	19940301	19	Con:
11	US 5196789 A		USPAT	19930323	7	Coa:

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U.S. Patent

Mar. 1, 1994

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5,291,129

Fig. 11

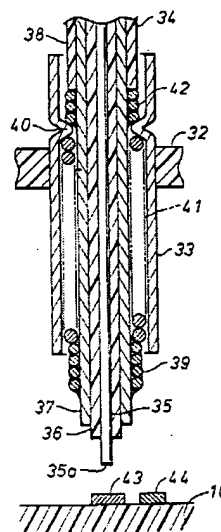
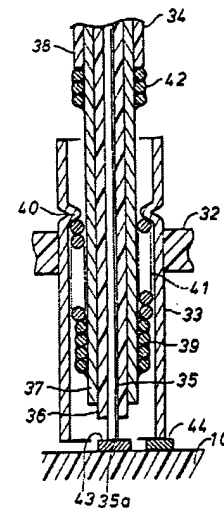


Fig. 12



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fixture 10. A coaxial cable 18 serves as a transmission line to connect the telescoping pin probe 12 to a compensation box 20 which houses active circuitry for providing the telescoping pin probe 12 with the required electrical characteristics. The compensation box 20 is powered by a power input line 22 which may be connected to any suitable power supply. The compensation box 20 includes a BNC connector 24 for connecting the compensation box 20 to the input of an electronic test instrument.

(3) Referring to FIG. 2, the telescoping pin probe 12 includes a telescoping pin 26 comprising a spring loaded sheath 28 and a sharpened contact point 30. The telescoping pin 26 is held inside an insulator 32. A circuit element 34 which may be an RC attenuator is also held within insulating sleeve 32 and is connected to the spring loaded sheath 28 of the telescoping pin 26 by a small wad of conductive elastomer 36. The output of the circuit element 34 is connected by another small wad of conductive elastomer 38 to the signal path 40 of a transmission line 18. The transmission line 18 also includes a coaxial ground shield 42 which is brought into electrical contact with a metal receptacle 44 held within the test fixture 10. The metal receptacle 44 is connected to a ground plane 16 which is in turn connected to ground telescoping

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United States Patent [19]

Hadwin et al.

[11] Patent Number: 4,739,259
[45] Date of Patent: Apr. 19, 1988

[54] TELESCOPING PIN PROBE

[75] Inventors: Matthew J. Hadwin, Battle Ground; John D. Gerde, Vancouver, both of Wash.; Emory J. Harry, Aloha, Oreg.

[73] Assignee: Tektronix, Inc., Beaverton, Oreg.

[21] Appl. No.: 891,034

[22] Filed: Aug. 1, 1986

[31] Int. Cl.: G01R 1/073

[52] U.S. Cl.: 324/188 P; 324/72.3; 324/73 PC; 439/420

[58] Field of Search: 324/72.3, 73 PC, 158 P, 324/149; 439/DIG. 1; 439/420

[56] References Cited

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4,352,990	2/1981	Sado	324/72.3 X

4,418,314 11/1981 Noto, Jr. 324/72.3

FOREIGN PATENT DOCUMENTS

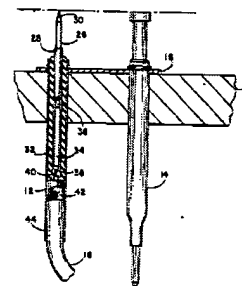
177609 4/1964 European Pat. Off. 324/158 P

Primary Examiner—Richard J. Elmsworth
Assistant Examiner—Stephen M. Baker
Attorney, Agent or Firm—William O. Geary, George T. Noy

[57] ABSTRACT

A probe for use in electrical circuit test equipment, in which a contact element is longitudinally slidable in an insulator sleeve which also contains an R-C attenuator circuit connected electrically to the contact element by an electrically conductive elastomeric material. A high impedance cable is connected electrically to the other end of the R-C attenuator circuit by another piece of conductive elastomeric material. The cable connects the attenuator to another R-C circuit which, together with the attenuator, forms a voltage divider, and the attenuated signal controls an amplifier which provides a signal through a low impedance cable to a test equipment.

11 Claims, 2 Drawing Sheets



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cooperating with a stud of the electronic card,

FIG. 5 is a corresponding plan view,

FIG. 6 is a view similar to FIG. 4, but for another relative position of the device and the stud,

FIG. 7 is a plan view corresponding to FIG. 6,

FIG. 8 is a view of a card portion,

FIG. 9 is a view of an installation adapted for cooperating with a contact device.

(1) DETAILED DESCRIPTION OF EMBODIMENTS

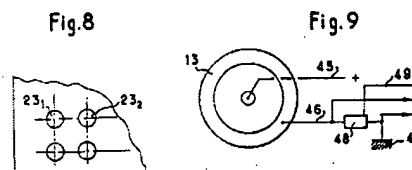
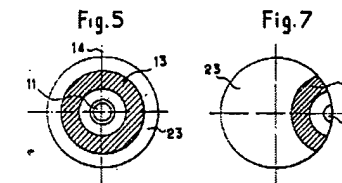
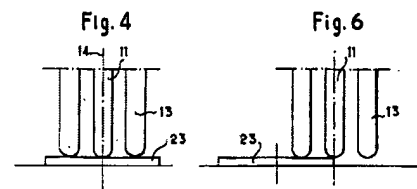
(2) A contact device comprises a central finger 11 (FIGS. 1 and 2), cylindrical, with its operating end 12 rounded, advantageously spherically, made of a conductive material, surrounded at a distance by a conductive sleeve 13 or annular member of same axis 14 as finger 11, an insulating member which, in this example, is provided by a jacket 15, being interposed between the outer surface 16 of the finger and the inner surface 17 of the sleeve 13.

(3) In an embodiment, the finger 11 has a diameter of 0.2 mm. The sleeve 13, the operational end portion of which is made by a portion of a toric surface

U.S. Patent Oct. 16, 1984

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4,477,774



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